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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 Forsyth Street
Atlanta, Georgia 30303

SITE: BROWN'S DUMP
BREAK: 3.12
OTHER:

MEMORANDUM

DATE: May 9, 2002

Subject: Review of Vegetable Garden Data
Jacksonville Ash and Browns Dump Sites
Jacksonville, Florida

To: Joseph Alfano, RPM
South Site Management Branch

Wes Hardegree, RPM
South Site Management Branch

From: H. Glenn Adams, Risk Assessment Specialist
Office of Technical Services

To address one of the data gaps identified in the risk assessments for the Jacksonville Ash sites and the Browns Dump site, samples were collected on January 15, 2002, from three gardens located near the 5th and Cleveland portion of the site. I have reviewed EPA's Science and Ecosystem Support Division (SESD) report dated March 15, 2002 on the sampling and analysis of this data; the March 16, 2002, memorandum from Susan Bland, Florida Department of Health, which evaluated this data. I also reviewed the Agency for Toxic Substances and Disease Registry's (ATSDR) fact sheet titled "Gardening in Anniston." All of this information was used in my evaluation of what risks are present from gardens that are potentially contaminated from the ash sites.

The SESD report provides information from two surface soil samples and two vegetable samples from each of the three gardens. The soil samples and vegetable samples were analyzed for the main contaminants of concern (COCs) at the sites [lead, arsenic, antimony, and polynuclear aromatic hydrocarbons (PAHs)]. Only lead was detected in the vegetables and each of the gardens represented a different level of soil lead contamination. Listed below are the maximum concentrations of lead in the garden soils and the maximum detected concentration of lead in the corresponding vegetable sample :

1. Garden 1: maximum soil lead concentration of 500 mg/kg with a maximum vegetable lead concentration of 0.16 mg/kg,
2. Garden 2: maximum soil lead concentration of 4,400 mg/kg with a maximum vegetable lead concentration of 0.28 mg/kg
3. Garden 3: maximum soil lead concentration of 73 mg/kg with a maximum vegetable lead concentration of 0.089 mg/kg,

The vegetables sampled were collards and/or mustard greens. These vegetables were chosen because of their availability and the fact that they were thought to represent the vegetables most likely to bioaccumulate lead, therefore providing the most conservative data available.

To determine if the lead levels detected would result in an unacceptable risk via ingestion of the vegetables, the EPA Integrated Exposure Uptake Biokinetic (IEUBK) model was run using the maximum detected lead concentrations in the vegetables from each of the three gardens. For this modeling event, it was conservatively assumed that 25% of all vegetables ingested come from the home garden and assumed that all of the vegetables ingested from that garden have the same concentration of lead in them. These are very conservative assumptions for four reasons:

1) 25% of all vegetables consumed are assumed to come from the garden,
2) the lead concentration in all vegetables are assumed to be the same as the concentration detected in the greens (e.g., tomatoes would have the same concentration as greens),
3) the data may represent some soil particles because the vegetables were washed but not actually cleaned of all dirt before being analyzed, and
4) exposure to children, the most sensitive receptor population, was evaluated.

The results of the IEUBK model conclude that under these circumstances the average blood lead level would only slightly increase even at the highest detected concentrations of lead in the greens. EPA Region 4 uses the Probability Distribution curve as one of its decision making tools. The goal is for the probability of being above the 10 ug/dl blood lead level cutoff to be less than 5%. The two lower detected concentrations are below 5% (2% and 3%, respectively) with the highest detected concentration being at 5.6% which is only slightly above the 5% goal.

It can be concluded from the above information that there is no unacceptable risks associated from ingestion of vegetables from gardens with soil lead concentrations less than 500 mg/kg. The two samples collected from the highest soil lead contamination location (maximum concentration of 4,400 mg/kg lead) showed a slight increase above acceptable levels via ingestion of vegetables, but it has already been determined by EPA that residential exposure to soils with lead concentrations of 4,400 mg/kg is unacceptable via direct contact to those soils.

Susan Bland's report from the Florida Department of Health concluded that "eating these vegetables with a lead concentration of 0.28 mg/kg in collards or mustard greens is unlikely to cause illness in children or adults."

The ATSDR fact sheet titled "Gardening in Anniston" provides information on good gardening practices and preparation tips. This fact sheet is attached and I recommend that copies be given to concerned citizens near the site or that a ATSDR be requested to provide a fact sheet for the Jacksonville sites.

In conclusion, based on the above data and references, the use of vegetable gardens with soil lead concentrations below or only slightly above EPA's recommended remedial goal of 400 mg/kg should not result in any significant increase in blood lead levels. Garden soil levels of lead significantly above 400 mg/kg may pose unacceptable risk with the risk potential increasing with increasing levels of soil lead. Regardless of the soil lead level, following good gardening and food preparation practices will lower risks.

If you have any questions or if you want to discuss these comments, please call me at 404-562-8771.

Attachment

cc: Elmer Akin, OTS
Kevin Koporec, OTS

Vegetable Garden.wpd

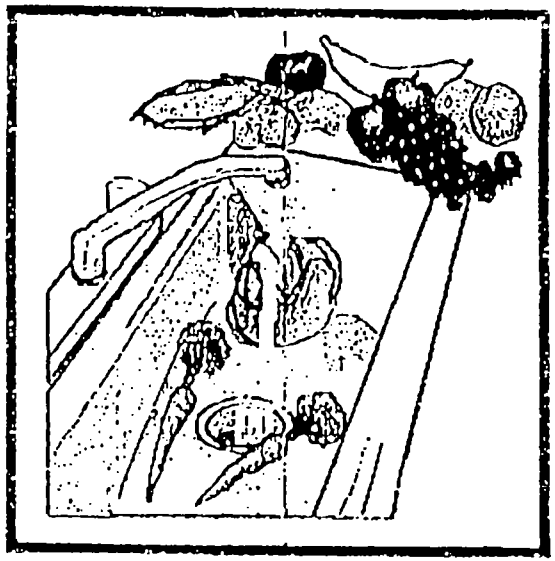
; By taking a few simple precautions, you can reduce your chances of being exposed to contaminated soil.

Preparing Your Garden

- Adding material such as compost or topsoil from outside sources such as commercial gardening centers will enrich your soil and help reduce the amount of contaminants that can be taken up by plants.

Working in the Garden

- Do not eat or drink while working in your garden because contaminated soil and dust might get on your food and you could accidentally swallow it.
- Avoid working in the garden on windy days, when dust can be stirred up and get in your nose or mouth.
- Be sure to wash your hands and work clothes to remove dust and dirt after gardening, and take off your shoes at the door to avoid tracking soil into your home.



Preparing Fruits and Vegetables

- Clean your hands, cutting boards, and kitchen tools with hot, soapy water and rinse well before and after handling produce.
- Run cool or slightly warm tap water over all produce several times to clean it. This is a good idea whether it is homegrown or comes from a market. Do not wash it with soap because some produce absorbs soap ingredients.
- Before cooking, soak greens in cool water overnight and then rinse thoroughly until the water runs clear. This is especially important for produce that grows low to the ground, such as collard greens, spinach, and lettuce.
- Scrub firm fruits and root-grown vegetables with a clean brush to remove dust and dirt before peeling or eating. These include carrots, turnips, potatoes, rutabagus, radishes, onions, and apples, just to mention a few.
- Wash berry fruits (strawberries, blackberries, etc.) and remove the "caps" (the tops of the berries where the stem and leaves attach).
- Remove outer leaves of leafy crops and thoroughly wash the remaining produce in water containing vinegar (1 percent).

Buy Some, Grow Some!

- Eat some fruits and vegetables from your garden and some from the farmers' market or grocery store. Eating a mix of home grown and commercial products can help reduce your potential for exposure.